

CLAIMS

1. An apparatus for manufacturing particles using corona discharge, comprising:

5 a guide duct;

a discharging means of which a discharge electrode is positioned within said guide duct, and which generate ions through electric discharge;

a reaction gas supplying means for supplying reaction gases into said guide duct;

10 a voltage applying means connected to said discharging means and said guide duct so as to generate voltage difference therebetween;

a heating means which is disposed on an outer surface of said guide duct for applying energy to the reaction gases so as to generate particles which are adhered to the ions generated by said discharging means;

15 a collecting means disposed to be spaced apart from outlet of said guide duct by a predetermined distance for collecting the particles.

2. The apparatus as claimed in claim 1, further comprising a supporting member which is fitted into said guide duct, with said discharging means held by said supporting member while passing through said supporting member, said supporting member being provided with a throughhole for allowing 5 interior of said guide duct to communicate with outside of said guide duct.

3. The apparatus as claimed in claim 2, further comprising a reaction control gas supplying means which supplies reaction control gases through the throughhole on said supporting member to generate a lot of ions from said 10 discharging means and to prevent chemical reaction from occurring around the discharge electrode.

4. The apparatus as claimed in claim 3, further comprising a guide electrode which is extended to interior of said guide duct while surrounding 15 the discharge electrode for guiding laminar flow of the generated ions.

5. The apparatus as claimed in claim 3, further comprising a cooling means connected to said collecting means for cooling said collecting means.

6. The apparatus as claimed in claim 1, wherein said guide duct is constructed with a plurality of mutually connected and electrically insulated tubes so that a different level of voltage is applied to the respective tube.

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7. The apparatus as claimed in claim 1, wherein the discharge electrode is formed out of a wire, and the wire is positioned between two guide plates, and reaction control gases are supplied between the guide plates.

10 8. The apparatus as claimed in claim 1, wherein said voltage applying means comprises a single power supply and a plurality of variable resistors.

9. An apparatus for manufacturing particles using corona discharge, comprising:

15 a first guide duct;
a second guide duct positioned at an outer side of said first guide duct and having an axis coaxial with said first guide duct;

a fourth guide duct positioned at an outer side of said second guide duct and having an axis coaxial with said second guide duct;

5 a discharging means of which discharge electrode is positioned within said first guide duct, and which generate ions through electric discharge;

10 a reaction control gas supplying means which supplies reaction control gases into said first guide duct to generate a lot of ions from said discharging means and to prevent chemical reaction from occurring around the discharge electrode;

a reaction gas supplying means for supplying reacting gases into said second guide duct;

15 a fuel gas supplying means for supplying fuel gases into said fourth guide duct;

a voltage applying means connected to said discharging means and said first guide duct so as to generate voltage difference therebetween;

20 a collecting means disposed to be spaced apart from outlet of said guide ducts by predetermined distance for collecting the particles of reaction gases adhered to the ions.

10. The apparatus as claimed in claim 9, further comprising a supporting member which is fitted into said first, second and fourth guide ducts, with said discharging means held by the supporting member while penetrating the 5 supporting member, said supporting member being provided with first, second and fourth throughholes for allowing interiors of said first, second and fourth guide ducts to communicate with outside of said first, second and fourth guide ducts.

10 11. The apparatus as claimed in claim 10, further comprising a cooling means connected to said collecting means for cooling said collecting means.

12. The apparatus as claimed in claim 9, further comprising a third guide duct positioned between said second and fourth guide ducts for supplying 15 sheath gas therebetween.

13. The apparatus as claimed in claim 9, wherein said voltage applying means comprises a single power supply and a plurality of variable resistors

14. An apparatus for manufacturing particles using corona discharge, comprising:

- a guide duct;
- 5 a discharging means of which a discharge electrode is positioned within said guide duct, and which generate ions through electric discharge;
- a reaction gas supplying means for supplying reacting gases into said guide duct;
- 10 a fuel gas supplying means for supplying fuel gases into said guide duct with the fuel gas being ignited and generating flame;
- a voltage applying means connected to said discharging means and said guide duct so as to generate voltage difference therebetween;
- a heating means which is disposed on an outer surface of said guide duct for applying energy to reaction gases so as to generate particles which
- 15 adhered to the ions generated by said discharging means;
- a collecting means disposed to be spaced apart from outlet of said guide duct by predetermined distance for collecting the particles.

15. The apparatus as claimed in claim 14, wherein the discharge electrode is formed out of a wire, and the wire is positioned between two guide plates the reaction control gas is supplied between the guide plates.

5 16. A method for manufacturing particles using corona discharge, comprising the steps of:

preparing an apparatus for manufacturing particles using corona discharge comprising a guide duct with a discharge electrode positioned therein, a voltage applying means connected to the discharge electrode and to 10 the guide duct, and a collecting means for collecting the particles;

applying high voltage to the discharge electrode and applying low voltage to the guide duct, while generating ions through the discharge electrode and guiding the generated ions along the guide duct;

supplying reaction gases into the guide duct;

15 applying energy to the reaction gases to generate particles which are adhered to the ions;

collecting the particles adhered to the ions by the collecting means positioned in front of the guide duct.

17. The method for manufacturing particles using corona discharge as claimed 16, wherein an outer surface of the guide duct is heated to apply energy to the reaction gases.

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18. The method for manufacturing particles using corona discharge as claimed 16, wherein fuel gases are supplied into the guide duct and the fuel gases are initiated to apply energy to the reaction gases.

10 19. The method for manufacturing particles using corona discharge as claimed 17, wherein further comprising a step of cooling the collecting means.